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IN THE SPECIFICATION:

Replace pages 4-18 in their entirety with the following:

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The present invention is made to solve the above-described problems and it is an object of the present invention to provide a data transmission and reception method which realizes highly-flexible accounting on fee-charged data, in accordance with reception of the data in units of receivers or in units of groups each having plural receivers, and a receiver used for this method.

DISCLOSURE OF THE INVENTION

In order to solve the above-described problems, according to the present invention (Claim aspect 1), there is provided a data transmission and reception method in which data transmitted from a transmitting end is received, on the basis of a reception contract, with plural receivers which have individual ID numbers and belong to the same group. In this method, the transmitting end assigns the same group ID number to the plural receivers, and manages the reception contract on the basis of the

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individual ID numbers or the group ID number. Therefore, the transmitting end can perform accounting in either contract system, i.e., the receiver-unit contract or the group-unit contract, and the receiving end can receive the data with plural receivers at the charge of one contract when the group-unit contract is adopted.

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Further, according to the present invention (Claimaspect 2), in the data transmission and reception method described in Claimaspect 1, the reception contract is updated at regular time intervals. Therefore, the contract system can be changed between the receiver-unit contract and the group-unit contract, resulting in more flexible setting of contract.

Further, according to the present invention (Claimaspect 3), in the data transmission and reception method described in Claimaspect 1, the data includes video, audio, and data which are transmitted by a data stream in digital broadcasting; and the reception contract is that a predetermined accounting is performed for a predetermined portion of the data stream which has been viewed for a predetermined period of time. Therefore,

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highly flexible setting is realized not only in the contract system but also in the accounting system.

Further, according to the present invention (Claimaspect 4), in the data transmission and reception method described in Claimaspect 3, the portion of the data stream is a service (channel). Therefore, in the accounting system of pay-per-view, the group-unit contract can be adopted to collect the charge.

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Further, according to the present invention (Claimaspect 5), in the data transmission and reception method described in Claimaspect 1, the content of the reception contract includes services which can be viewed at the receiving end and the term of the contract, and they are multiplexed in the data stream to be transmitted to the receiving end. Therefore, the receiving end can descramble the data on the basis of the content of the reception contract to receive only the viewable service.

Further, according to the present invention (Claimaspect 6), the data transmission and reception method described in Claimaspect 4, comprises: a first individual ID number notification step of notifying the transmitting end of the individual ID number which is possessed by a first receiver

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amongst the plural receivers belonging to the same group; a contract information notification step of notifying the transmitting end of ID information for identifying a service with which the first receiver makes a reception contract; an additional individual ID number notification step of notifying the transmitting end of the individual ID number of at least one additional receiver which belongs to the same group as the first receiver, and information indicating that the additional receiver and the first receiver belong to the same group; a group ID number assignment step of assigning, by the transmitting end which has received the notification, the same group ID number to the first receiver and the additional receiver; and a contract information input step of inputting the ID information of the service with which the first receiver has made the reception contract, into the additional receiver. Therefore, with respect to the service with which the first receiver has made the reception contract, plural receivers which belong to the same group as the first receiver can receive this service at the charge of one contract.

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Further, according to the present invention (Claimaspect 7), in the data transmission and reception method described in Claimaspect 6, the first individual ID number notification step includes a step of notifying the transmitting end of a telephone line number connected to the first receiver; in the additional individual ID number notification step, the additional receiver belongs to the same group as the first receiver and is connected to the same telephone line as that connected to the first receiver; and the method further includes: an ID number notification step in which the respective receivers notify the transmitting end of their individual ID numbers and the group ID number, through the telephone line connected to the receivers, at predetermined time intervals; and a number collation step in which, at the transmitting end, the individual ID number of the plural receivers belonging to the same group and the group ID numbers, which are notified through the telephone line at predetermined time intervals, are collated with the individual ID numbers, the group ID number, and the telephone line number which have already been registered at the transmitting end.

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Therefore, if a receiver under the group-unit contract is not used within the group, the transmitting end can grasp this fact.

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Further, according to the present invention (Claimaspect 8), in the data transmission and reception method described in Claimaspect 6 or 7, the contract information input step is inputting the ID information of the service with which the first receiver has made the reception contract, the ID information being transmitted from the transmitting end. Therefore, the user is saved from inputting the contract information at the receiving end, whereby input errors are avoided.

Further, according to the present invention (Claimaspect 9), the data transmission and reception method described in Claimaspect 7 further includes a warning step of sending a warning from the transmitting end to the receiving end when the notified numbers do not match the registered numbers in the collation step. Therefore, if the receiving end continues the breach of contract even after the warning, it is easy for the transmitting end to take action against the breach, such as abortion of services to the receiver which breaches the contract or all the receivers in the group.

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Further, according to the present invention (Claimaspect 10), in the data transmission and reception method described in Claimaspect 6 or 7, in the group ID number assignment step, the group ID number is multiplexed in the data stream together with video and audio to be transmitted to the receiver. Therefore, the group ID number can be easily transmitted together with the data.

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Further, according to the present invention (Claimaspect 11), in the data transmission and reception method described in Claimaspect 10, the group ID number is stored in CA (Conditional Access) EMM (Entitlement Management Message) of the data stream to be transmitted. Therefore, the group ID number can be easily transmitted in a pair with IRD_ID which has conventionally been transmitted.

Further, according to the present invention (Claimaspect 12), in the data transmission and reception method described in Claimaspect 6 or 7, the group ID number is transmitted through a transmission path different from the data stream, to the receiver. Therefore, the group ID number can be transmitted

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with higher reliability by using a transmission line having less jamming, such as a telephone line.

Further, according to the present invention (Claimaspect 13), in the data transmission and reception method described in Claimaspect 3, the portion of the data stream is an event (program). Therefore, in the accounting system of pay-per-view, the group-unit contract can be adopted to collect the charge.

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Further, according to the present invention (Claimaspect 14) the data transmission and reception method described in Claimaspect 13 comprises: a first individual ID number notification step of notifying the transmitting end of the individual ID number which is possessed by the first receiver amongst the plural receivers which belong to the same group; and additional individual ID number notification step of notifying the transmitting end of the individual ID number of at least one additional receiver which belongs to the same group as the first receiver, and information indicating that this additional receiver and the first receiver belong to the same group; a group ID number assignment step of assigning, by the transmitting end which has received the notification, the same

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group ID number to the first receiver and the additional receiver; and a result-of-viewing notification step in which, when an event (program) has been viewed with the plural receivers which belong to the same group and have the same group ID number, the transmitting end is notified of the individual ID numbers of the plural receivers, the group ID number thereof, and the information specifying the event (program) which has been viewed. Therefore, the transmitting end confirms that the plural receivers having the same group ID number receive the same event (program), and accounts to the group for the charge of the event which has been viewed by one receiver.

Further, according to the present invention (Claimaspect 15), in the data transmission and reception method described in Claimaspect 14, the information specifying the event (program) includes a program ID number for identifying the event (program). Therefore, the transmitting end can know that the event received by the plural receivers are identical.

Further, according to the present invention (Claimaspect 16), in the data transmission and reception method described in Claimaspect 14, the group ID number assignment step includes a

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step of outputting information which indicates that either receiver-unit accounting or group-unit accounting is to be applied to each event (program). Therefore, when this information is displayed on the screen at the receiving end, the user can know the accounting system for the event, and change the number of the receivers to be used to view the event.

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Further, according to the present invention (Claim aspect 17), there is provided a receiver used for a data transmission and reception method in which a data stream transmitted from the transmitting end is received by plural receivers which have different individual ID numbers and belong to the same group, on the basis of a reception contract, and the transmitting end assigns the same group ID number to the plural receivers and transmits information about the reception contract for the group ID number or from the individual ID number, and manages the contract including accounting, in units of groups or receivers. This receiver comprises: storage means for storing the group ID number transmitted from the transmitting end; demultiplexing means for extracting the information about the reception contract, from the transmitted data stream; control means for

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analyzing the extracted information about the reception contract to recognize a receivable service, and instructing the demultiplexing means to extract key information for descrambling the receivable service, from the data stream, thereby obtaining the key information; and decoding means for descrambling the receivable service from the data stream, under control of the control means, on the basis of the information including the recognized receivable service and the extracted key information. Therefore, the user can view the service with the plural receivers belonging to the same group, at the charge of one contract.

Further, according to the present invention (Claim aspect 18), there is provided a receiver used for a data transmission and reception method in which a data stream transmitted from the transmitting end is received by plural receivers which have different individual ID numbers and belong to the same group, on the basis of a reception contract, and the transmitting end assigns the same group ID number to the plural receivers, and manages the reception contract including accounting, in units of groups or receivers. This receiver comprises: storage means for

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storing the group ID number transmitted from the transmitting end; demultiplexing means for extracting the history of viewing which includes at least accounting information of an event (program) which has been viewed and information specifying the event (program), from the transmitted data stream; card means for storing the extracted history of viewing; and card interface means for transmitting the stored history of viewing, and the individual ID number and the group ID number possessed by the receiver, to an external management center. Since the receiving end can notify the control center that the same event (program) has been viewed with plural receivers which belong to the same group, the user (group) can view the event (program) for which group-unit viewing is permitted, at the charge of one receiver.

Further, according to the present invention (Claimaspect 19), the receiver described in Claimaspect 17 or 18 further comprises ID number notification means for notifying the transmitting end of at least the individual ID number and the group ID number of the receiver, through a telephone line connected to the receiver, at predetermined time intervals.

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Therefore, if a receiver under the group-unit contract is not used within the group, the transmitting end can know this fact.

BRIEF DESCRIPTION OF THE DRAWINGS

Figures 1(a) and 1(b) are schematic diagrams illustrating EMM (Entitlement Management Message) sections containing IRD_Gr_ID used in a data transmission and reception method according to a first embodiment.

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Figures 2(a) and 2(b) are diagrams illustrating examples of management information lists to be transmitted from the transmitting end in the data transmission and reception method according to the first embodiment.

Figure 3 is a diagram illustrating the structure of a receiver used for the data transmission and reception method according to the first embodiment.

Figure 4 is a flowchart for explaining an example of the data transmission and reception method according to the first embodiment.

Figure 5 is a diagram illustrating an example of PPV_Group_descriptor to be transmitted from the transmitting end

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in a data transmission and reception method according to a second embodiment.

Figure 6 is a flowchart for explaining an example of the data transmission and reception method according to the second embodiment.

BEST MODE TO EXECUTE THE INVENTION

Hereinafter, embodiments of the present invention will be described in detail with reference to the drawings.

B¹ Embodiment 1.

Figures 1(a) and 1(b) are schematic diagrams illustrating entitlement management message (EMM) sections containing IRD_Gr_ID used in a data transmission and reception method according to a first embodiment of the present invention. More specifically, figure 1(a) shows an example where one EMM section contains only one pair of IRD_ID and IRD_Gr_ID, and figure 1(b) shows an example where one EMM section contains plural pairs of IRD_ID and IRD_GR_ID.

Each EMM section is defined by MPEG2 standard and includes an EMM section header as header information, IRD_ID, and CRC_32

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(CRC: Cyclic Redundancy Check), in which key information to be transmitted to each viewer according to the contract of the viewer in fee-charging broadcasting, is described. Further, IRD_ID is an ID number for individually identifying a digital broadcast receiver (hereinafter, referred to as an IRD (Integrated Receiver Decoder)) possessed by each viewer. When the transmitting end outputs a set of the individual IRD_ID and the corresponding key information, the IRD at the receiving end can take only the key information directed to itself according to the IRD_ID.

In the figure, the EMM defined by MPEG2 standard further contains IRD_Gr_ID to be output. In the case where one group such as a family or a company possesses two or more IRDs, this IRD_Gr_ID is a group ID number for identifying the group, and these IRDs are assigned the same IRD_Gr_ID. Since these IRDs are assigned the respective IRD_ID as well, these IRDs can be identified not only in the group unit but also in the IRD units.

Figures 2(a) and 2(b) are diagrams illustrating examples of management information lists to be transmitted from the

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transmitting end in the data transmission and reception method according to the first embodiment of the invention.

These management information lists are included in the EMM section to be transmitted.

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The management information list A shown in figure 2(a) is an example in the case where the group-unit contract is employed in the accounting system of pay-per-channel. That is, one contract is made with a group having IRD_Gr_ID = 100, for channels 101CH, 105CH, 208CH, 301CH, etc., under the accounting condition that the monthly charge per CH is 1000 yen. One the management information list A, the contract channels which can be viewed with the IRDs having each group ID number at listed, and each of the IRDs which has received the management information list A can recognize the channels listed on the management data list with the group ID number of itself, as the contract channels.

Further, the management information list B shown in figure 2(b) is an example in the case where the IRD-unit contract is employed in the accounting system of pay-per-channel. That is, one contract is made with an IRD having IRD_ID = 1000, for

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channels 103CH, 125CH, 258CH, 309CH, etc., under the accounting condition that a fixed charge per CH is charged for a predetermined period of time (per day, month, or year).

Figure 3 is a block diagram illustrating receivers used in the data transmission and reception method according to the first embodiment of the present invention.

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In the figure, 11 and 31 denote tuners for receiving signals of data streams transmitted by digital broadcasting. 12 and 32 denote demodulators for demodulating digital-modulated broadcast signals. 13 and 33 denote error correction units for correcting transmission line errors by using error correction signals for correcting bit errors in digital broadcasting.

Further, 14 and 34 denote descramblers for descrambling video and audio data of the data streams which have been error-corrected in the error correction units 13 and 33, respectively, on the basis of the key information. 15 and 35 denote demultiplexers for extracting EMM sections from the data streams, and demultiplexing the video and audio data descrambled by the descramblers 14 and 34, respectively. 16 and 36 denote controllers for controlling the operations of the respective

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constituents. 17 and 37 denote storage units for storing IRD_Gr_ID extracted by the controllers 16 and 36 from the EMM sections extracted by the demultiplexers 15 and 35, respectively. In the storage units 17 and 37, the IRD_ID of the respective IRDs are stored. 18 and 38 denote video and audio decoders for decoding the descrambled video and audio data which have been demultiplexed by the demultiplexers 15 and 35, respectively. 19 and 39 denote video display units for displaying the video decoded by the video and audio decoders 18 and 38, respectively. 20 and 40 denote audio output units for outputting the audio decoded by the video and audio decoders 18 and 38, respectively. 21 denotes an upstream controller for periodically transmitting the IRD_ID and the IRD_Gr_ID of each IRD, from the IRD through the telephone line to the customer control center, under control of the controllers 16 and 36. 51 and 71 denote cards such as IC cards in which key information different from that included in the EMM is recorded. 52 and 72 denote card interfaces for connecting the cards 51 and 72 with the IRD bodies to transmit the data recorded in the cards 51 and 71 to the respective parts of the IRDs.

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While in figure 3 the card interfaces 52 and 72 are low-speed interfaces, the card interfaces may be high-speed interfaces.

Figure 4 is a flowchart for explaining an example of the data transmission and reception method according to the first embodiment.

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Hereinafter, the data transmission and reception method according to the first embodiment will be described with reference to figures 1-4.

First of all, when a viewer A has brought a first IRD (IRD1), the viewer makes a contract with a carrier. At this time, the viewer A notifies the carrier of the IRD_ID of the IRD1, the fee-charged channels for which the viewer makes the contract, and the telephone line number connected to the IRD1 (step S1).

The carrier (transmitting end) transmits the EMM shown in figure 1(a) or 1(b) to the IRD1 (Step S2). In the EMM transmitted, the IRD-unit management information list shown in figure 2(b) and the key information are included.

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The IRD1 receives, with the tuner 11, a signal of a data stream transmitted by digital broadcasting. In the IRD1, the demodulator 12 demodulates this signal, and the error correction unit 13 corrects the transmission line error by using an error correction code for correcting the bit error. The demultiplexer 15 extracts the EMM from the data stream which has been error-corrected by the error correction unit 13. The controller 16 takes the EMM to recognize the fee-charged channels (services) for which the contract is made, with reference to the management information list B, and extracts the key information from the EMM. Further, the controller 16 instructs the descrambler 14 to descramble the video and audio data of the program (event) of the contract channel (service), through the card interface 52, on the
